

The quadrantal and semi-circular series of observations both gave evidence of periodic vibrations of 115 seconds, but so small that they could only be put down as giving superior limits, and not at all as proving the existence of the couples.

Assuming that the gravitation constant in the quadrantal case is G for parallel and G' for crossed axes, the existence of a couple enables us to find $(G - G')/G$, and the observations show that this fraction is not greater than $1/16500$.

Assuming that the gravitation constant in the semi-circular case is G for like parallel axes, and G' for unlike parallel axes, $(G - G')/G$ is not greater than $1/2850$. The semi-circular vibration outstanding after the elimination of disturbances was much greater than the quadrantal, no doubt owing to the fact that want of axial symmetry would itself lead to a semi-circular couple; and though an attempt was made to eliminate the effect, it was probably unsuccessful.

“Contributions to our Knowledge of the Formation, Storage, and Depletion of Carbohydrates in Monocotyledons.” By JOHN PARKIN, M.A., Trin. Coll., Camb. Communicated by Professor MARSHALL WARD. Received July 16,—Read November 17, 1898.

(Abstract.)

The paper is divided into two parts, the first dealing with the formation of starch by assimilation in the leaves, the second with the occurrence of starch and inulins in the reserve-organs of various Monocotyledons.

The author has investigated about seventy species, belonging to all the principal groups of Monocotyledons, some of them at various different stages of growth, and finds that starch due to normal assimilation in the leaves occurs in very different amounts in different genera. Relatively few produce much, and some form none at all, but species from most of the principal families form some starch in their mesophyll.

On comparing the type of leaf, its position and age, the habit of the plant, and the period of normal activity, the author is led to suggest that some connection exists with the storage or non-storage of temporary starch. Broad and cauline leaves, those of aquatic Monocotyledons, and those working at higher temperatures in the summer, seem more prone to have starch than narrow radical leaves, those of forms in dry situations, and those of spring species. That the age of the leaf affects the question is shown by the results with *Allium*, a genus long known not to form starch under ordinary conditions: the

author finds that starch is developed even in this plant in the young leaves.

The starch of the stomatal guard cells is next examined, and the difficulty of depleting these cells discussed. In experiments with cut leaves exposed to sunlight little or no appreciable increase of starch could be obtained. In experiments with pieces of leaves floated on sugar solutions, cane sugar was found to produce starch far better than any other; invert-sugar, glucose, and fructose follow next in order, and maltose is almost useless.

The necessary details of the experiments, and discussion of results and previous literature are given in the full paper.

In Part II the author deals in detail with certain inulins which he has discovered in *Scilla nutans* and *Galanthus nivalis*, and shows by the examination of many other genera that inulin is by no means uncommon in Monocotyledons.

The inulin of *Scilla* is remarkable for its easy solubility in cold water, while that of *Galanthus* requires water at 80° C. for solution; ordinary inulin from *Helianthus* and other Compositæ dissolves at about 50° C.

The proofs of the inulin nature of these bodies, their reactions and mode of occurrence are worked out in detail. Contrary to previous assumption, inulin and starch may co-exist in the same cell.

It is interesting to note that aquatic species do not store inulin, apparently, but that it is common in those inhabiting dry situations; the author regards the concentrated solution in the cell-sap of such plants as useful in resisting drought.

The paper concludes with a detailed examination of the behaviour of the starch and inulin in the bulb of *Galanthus* at various periods throughout its whole annual cycle of development, comparing the stages with those in the bulb of *Narcissus*.

Summaries of the literature, and illustrations, accompany the full paper.

“Further Observations on the Effects of Partial Thyroidectomy.”

By WALTER EDMUNDS. Communicated by Dr. ROSE BRADFORD, F.R.S. Received October 17,—Read November 17, 1898.

(From the Laboratory of the Brown Institution.)

Two years ago Vassale and Generali published some interesting experiments on the thyroid; they found that excision of the four parathyroids that occur in dogs (leaving the thyroid lobes) was followed by symptoms practically identical with those produced by excision of the entire thyroid, including the parathyroids.